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THE GOES-R GEOSTATIONARY LIGHTNING MAPPER (GLM): ALGORITHM AND INSTRUMENT STATUS

Steven J. Goodman¹

Richard J. Blakeslee²

William J. Koshak²

Douglas Mach²

¹NOAA/NESDIS GOES-R Program Office, NASA GSFC, Greenbelt, MD 20771

²NASA George C. Marshall Space Flight Center/NSSTC, Huntsville, AL 35805

Abstract - The Geostationary Operational Environmental Satellite (GOES-R) is the next series to follow the existing GOES system currently operating over the Western Hemisphere. Superior spacecraft and instrument technology will support expanded detection of environmental phenomena, resulting in more timely and accurate forecasts and warnings. Advancements over current GOES capabilities include a new capability for total lightning detection (cloud and cloud-to-ground flashes) from the Geostationary Lightning Mapper (GLM), and improved capability for the Advanced Baseline Imager (ABI). The Geostationary Lightning Mapper (GLM) will map total lightning activity (in-cloud and cloud-to-ground lightning flashes) continuously day and night with near-uniform spatial resolution of 8 km with a product refresh rate of less than 20 sec over the Americas and adjacent oceanic regions. This will aid in forecasting severe storms and tornado activity, and convective weather impacts on aviation safety and efficiency. In parallel with the instrument development (a prototype and 4 flight models), a GOES-R Risk Reduction Team and Algorithm Working Group Lightning Applications Team have begun to develop the Level 2 algorithms, cal/val performance monitoring tools, and new applications. Proxy total lightning data from the NASA Lightning Imaging Sensor on the Tropical Rainfall Measuring Mission (TRMM) satellite and regional test beds are being used to develop the pre-launch algorithms and applications, and also improve our knowledge of thunderstorm initiation and evolution. A joint field campaign with Brazilian researchers in 2010-2011 will produce concurrent observations from a VHF lightning mapping array, Meteosat multi-band imagery, Tropical Rainfall Measuring Mission (TRMM) Lightning Imaging Sensor (LIS) overpasses, and related ground and in-situ lightning and meteorological measurements in the vicinity of Sao Paulo. These data will provide a new comprehensive proxy data set for algorithm and application development.